

25

Notice of Allowability	Application No.	Applicant(s)	
	10/804,692	MAKAROV ET AL.	
	Examiner	Art Unit	
	Bernard E. Souw	2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Amendment 2/16/2006.
2. ☒ The allowed claim(s) is/are 1-14, 16-26, 29-41 and 43-57.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
 - * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|---|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____ |
| 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date <u>11/8/05+12/12/05</u> | 7. <input type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____ |

DETAILED ACTION

Information Disclosure Statement

1. Receipt is acknowledged of information disclosure statements (IDS) submitted on 10/20/2004. The submission is in compliance with the provisions of 37 CFR 1.97.

Signed copies of the information disclosure statement are here enclosed.

Amendment

2. The Amendment filed 02/16/2006 has been entered.
 - ▶ Claims 15, 27, 28 and 42 have been canceled.
 - ▶ New Claims 54-57 have been added.
 - ▶ Claims 1-14, 16-26, 29-41 and 43-57 are pending in this office action.

ALLOWANCE

3. Claims 1-14, 16-26, 29-41 and 43-57 are allowed.
The claims are subsequently renumbered to claims 1-53.

Reasons for Allowance

4. The following is an examiner's statement of reasons for allowance:
 - ▶ Claims 1 and 39 are allowed for reciting a mass spectrometer or a method of operating the same, the mass spectrometer comprising an ion source, an ion trap with a plurality of elongate electrodes, a collision cell and a time of flight analyzer, wherein the

Art Unit: 2881

ion trap ejects ions within a relatively narrow range of m/z values substantially orthogonally with respect to the direction of elongation of the electrodes such that the ejected ions travel to the collision cell, while retaining other ions in the ion trap for subsequent analysis and/or fragmentation, which limitations being neither anticipated nor rendered obvious by any prior art.

Claims 2-14, 16-26, 29-33, 40, 41, 43, 44 and 54-57 are also allowed because of their dependencies, either directly or indirectly, upon claims 1 or 39.

► Claim 34 is allowed for reciting a tandem mass spectrometry comprising an ion source, a first trapping region, a second trapping region comprising a plurality of elongate electrodes, a collision cell, an ion detector, and a time of flight mass analyzer, the method comprising (1) a first selection/analysis stage of: (1a) operating the first trapping region to eject a first secondary subset of a primary set of precursor ions into the second trapping region --while retaining other ions from the primary set of precursor ions in the first trapping region--; (1b) operating the second trapping region to trap ions from the first secondary subset of precursor ions introduced from the first trapping region, and operating the ion detector to obtain a mass spectrum of the first secondary subset of precursor ions; (1c) performing a plurality of fragmentation/analysis stages of the trapped first secondary subset of precursor ions; (2) a second selection/analysis stage comprising (2a) operating the first trapping region to eject a second secondary subset of the primary set of the precursor ions into the second trapping region; (2b) operating the second trapping region to trap ions from the first secondary subset of precursor ions, and operating the ion detector to obtain a mass spectrum of trapped

Art Unit: 2881

ions from the second secondary subset of precursor ions; and (2c) performing a plurality of fragmentation/analysis stages of the trapped second secondary subset of precursor ions; (3) wherein each of the plurality of fragmentation/analysis stages comprises the steps of (3a) operating the second trapping region to eject a tertiary subset of precursor ions with a relatively narrow range of m/z values substantially orthogonally with respect to the direction of elongation of the electrodes such that they are introduced into the collision cell; (3b) operating the collision cell such that ions from the tertiary subset of precursor ions are fragmented; (3c) introducing fragmented ions from the collision cell into the time of flight mass analyzer, and (3d) operating the time of flight mass analyzer to obtain a mass spectrum of the fragmented ions, wherein the tertiary subsets of precursor ions for each of the secondary subsets have different relatively narrow ranges of m/z values, which limitations being neither anticipated nor rendered obvious by any prior art.

Claims 35-38 are also allowed because of their dependencies, either directly or indirectly, upon claim 34.

► Claim 45 is allowed for reciting a composite ion trap comprising first and second ion storage volumes being arranged substantially co-axially, the common axis defining an ion path through the first ion storage volume and into the second ion storage volume; the first ion storage volume being defined by an entrance electrode at one end and by a common electrode at the other end, the entrance electrode and the common electrode being operable to provide a trapping field for trapping ions within a first relatively broad range of m/z values in the first ion storage volume, the first ion storage volume further

Art Unit: 2881

comprising one or more electrodes operable to eject trapped ions within an intermediate m/z range axially along the ion path into the second ion storage volume; the second ion storage volume being defined by the common electrode at one end and a further electrode at the other end (i.e., the same common electrode 150 for both storage volumes 130 and 230 in disclosure Fig.13), the common electrode and the further electrode being operable to provide a trapping field for trapping ions in the second ion storage volume, the second ion storage volume further comprising a plurality of elongate electrodes operable to eject trapped ions within a relatively narrow m/z range from the second ion storage volume substantially orthogonally to the direction of elongation through an exit aperture, which limitations being neither anticipated nor rendered obvious by any prior art.

Claims 46-53 are also allowed because of their dependencies, either directly or indirectly, upon claim 45.

5. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Relevant Prior Art

6. This prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Art Unit: 2881

(a) USPAT 5,763,878, issued to Franzen and USPAT 6,753,523 issued to Whitehouse et al. disclose a single ion trap mass spectrometer having elongated electrodes and equipped with a collision/fragmentation cell in tandem with a time-of-flight (TOF) mass spectrometer. However, both Franzen's and Whitehouse's eject mass-selected ions axially into the collision cell, as recited in claims 1 and 39; orthogonal ejection is only made into the TOF mass spectrometer. Furthermore, Franzen's and Whitehouse's are both single ion traps, not a tandem ion trap consisting of a first trapping region and a second trapping region as recited in claims 34 and 45. By the way, both Franzen's and Whitehouse's are not really ion trap mass spectrometers, since mass selection is thereby performed by an ion guide in front of the ion trap.

(b) USPAT 6,483,109 issued to Reinhold et al., and USPAT 6,545,268, both disclose an array of ion traps, some of which may be operated as collision cells. However, all of the ion traps are connected axially, i.e., in the direction of the elongated electrodes, but none is connected orthogonally, as recited in claims 1 and 39. However, neither Reinhold nor Whitehouse recites the steps of ejecting a first secondary subset of precursor ions from the first ion trap into the second ion trap for subsequent fragmentation and analysis/detection, then ejecting a second secondary subset of precursor ions (from the first ion trap) into the same second ion trap, and again for subsequent fragmentation and analysis/detection, then finally ejecting a third (secondary) subset of precursor ions orthogonally into a TOF mass spectrometer, as recited in claim 34. Furthermore, Verentchikov's TOF mass spectrometer is connected axially to the ion trap array.

Art Unit: 2881

(c) No prior art can be found for a tandem ion trap consisting of two adjacent ion traps having one electrode in common, as recited in claim 45.

Communications


7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bernard E Souw whose telephone number is 571 272 2482. The examiner can normally be reached on Monday thru Friday, 9:00 am to 5:00 pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R Lee can be reached on 571 272 2477. The central fax phone number for the organization where this application or proceeding is assigned is 571 273 8300 for regular communications as well as for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571 272 5993.

bes

March 24, 2006


NIKITA WELLS
PRIMARY EXAMINER 03/27/06